

# Emergency Action Plan (EAP) Guidelines

(Revised 9/11/2017)

## Interagency Committee on Dam Safety (ICODS) Format

The ICODS EAP Guidelines for Dam Owners is recommended for consistency and uniformity. The format also serves as a checklist for completeness. When completed, the EAP will have two sections: the basic EAP and the appendices.

## Format and Content

Title Page/Cover Sheet/Table of Contents

- I. Notification Flowchart
- II. Statement of Purpose
- III. Project Description
- IV. Emergency Detection, Evaluation, and Classification
- V. General Responsibilities
  - A. Dam Owner
  - B. Notification
  - C. Evacuation
  - D. Termination and follow-up
  - E. EAP coordination
- VI. Preparedness
- VII. Inundation Maps
- VIII. Appendices
  - Appendix A: Investigation and Analyses of Dam Break Floods
  - Appendix B: Plans for Training, Exercising, Updating, and Posting EAP
  - Appendix C: Site-Specific Concerns
  - Appendix D: Approval of the EAP

## TITLE PAGE/COVER SHEET/TABLE OF CONTENTS

The purpose of the title page and cover sheet of an EAP is to identify the document as an EAP and to specify the name of the dam, classification, and file number. The table of contents, which will list all the major sections and subsections in the EAP, provides a quick means for locating information.

### Section I: NOTIFICATION FLOWCHART

The notification flowchart provides the hierarchy for notification in the event of an emergency. The flowchart must include the following essential information.

- Who notifies whom
- Names, titles, telephone numbers, alternate contacts, and communication mechanisms

The notification flowchart(s) should be brief, simple, and easy to follow. Notification must flow in both directions and the number of people notified by each individual should be limited. The

flowchart should be prominently displayed on the first page of the EAP and also posted as a stand-alone chart.

Color coding can be helpful as long as the color does not obscure the text. The individuals and entities that may be included on the notification flowchart:

- Dam Owner
- Appropriate Federal, State, and Local Agencies  
ODNR, Division of Water Resources office (614) 265-6731 and 24 hour emergency (614) 799-9538
- Residents and property owners downstream of the dam
- Operators of other dams
- Managers of recreational facilities
- National Weather Service (NWS)
- News Media
- Others

## **Section II: STATEMENT OF PURPOSE**

This section defines the purpose and scope of the EAP. (1 or 2 paragraphs)

## **Section III: PROJECT DESCRIPTION**

Must include the following:

- Description and drawing of the dam and appurtenant parts of the dam.
- Project location (vicinity map) (State and County)
- Note significant upstream and downstream dams
- Downstream communities potentially affected by a dam failure or flooding as a result of large operational releases
- Any other relevant information

## **Section IV: EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION**

- **Detection** of the emergency condition
  - Data and information collection system
  - Process for analyzing data
- **Evaluation** of information
  - Procedures for assessing information
  - Provisions for establishing the severity and magnitude of the emergency
- **Classification** of emergency based on urgency
  - Indicates urgency of the situation
  - Emergency classification chosen and agreed to by dam owner and emergency management officials
  - Must be relevant to emergency conditions
  - Must include the following three alert levels: Monitor, Watch, and Warning

The three classifications of dam alert statuses are listed below. The EAP should describe how each alert status applies to the particular dam. Information to assist the dam owner in

determining the appropriate emergency alert status should be developed and included in the EAP.

**Monitor** – A hazardous condition exists, requiring investigation and corrective action; potential for failure is being assessed; corrective measures are underway.

- Include procedures for investigation and assessment
- Include procedures for implementing interim risk reduction measures
- Notify the appropriate personnel and agencies

**Watch** – Potential failure situation is developing.

- Include procedures for assessing the possible mode of failure
- Include procedures for implementing corrective measures
- Notify the appropriate personnel and agencies
- Include procedures for the possible transition from a Watch to a Warning alert level

**Warning** – Dam failure is occurring or is imminent.

- Time to failure is impossible to determine but should be assumed to be very short
- Assume that corrective measures at the dam are not possible
- Public protective actions are required
- Notify the appropriate personnel and agencies

## **Section V: GENERAL RESPONSIBILITIES**

The General Responsibilities section of the EAP are:

- Dam owner responsibilities
- Responsibility for notification
- Responsibility for evacuation
- Responsibility for duration, termination, security, and follow-up
- EAP coordinator responsibility

### **Dam Owner Responsibilities**

The responsibilities of the dam owner must be clearly and specifically defined. The following responsibilities should be delineated:

- The decision-making process, including the selection of the appropriate emergency condition
- Specific actions to be taken
- Who will take the actions
- Internal (at the dam) and external (off-site) notification activities

This section should provide guidance on communicating the emergency situation to others and should spell out the chain of command and specific emergency actions.

## Responsibility for Notification

Clearly identify the dam owner personnel authorized to notify local officials. The most important elements of this section are:

- Specificity
- Delegation of responsibility and authority
- Timely notification
- Procedures for notifying agencies such as the National Weather Service
- Procedures for notifying media
- Sample messages

## Responsibility for Evacuation

Agencies with a statutory obligation are responsible for evacuation. The dam owner:

- Should **not** assume agency responsibility
- **Should** coordinate with appropriate officials

This section of the EAP should specify coordinated and agreed-to evacuation responsibilities of the dam owner, if any. Inundation maps help the evacuation effort.

## Responsibility for Duration, Security, Termination, and Follow-Up

- The dam owner and dam personnel must monitor the emergency situation at the dam and keep the authorities informed of developing conditions.
- The dam owner must specify security measures at the dam during the emergency.
- Officials and agencies are responsible for terminating emergency status in affected areas.
- The dam owner terminates the emergency of the dam.
- There should be a follow-up evaluation by the participants involved in the emergency.

## EAP Coordinator Responsibility

The name of the EAP Coordinator must be specifically identified in the EAP. The following are responsibilities of the EAP coordinator:

- Revised EAP
- Establishes training seminars
- Coordinated EAP exercises
- Serves as the EAP contact for:
  - emergencies
  - non-emergencies

## **Section VI: PREPAREDNESS**

There are two primary objectives to this section of the EAP: to describe preplanned and emergency actions and to specify emergency measures. The rationale for the first objective of this section is to describe preplanned and emergency actions. This may:

- Prevent a failure from developing
- If possible, minimize loss of life and property damage
- Issue timely warning, and facilitate operation of the dam

The seven areas that must be considered in the development of the section on emergency measures are:

- Surveillance
- Response during periods of darkness
- Access to the site
- Response during weekends and holidays
- Response during adverse weather
- Alternate means of communication
- Emergency supplies and resources

### **Surveillance**

- Provisions for prompt detection and evacuation
- Instrumental and/or physical inspections
- Unattended dams (not continuously attended 24 hours a day)
  - Surveillance procedures and systems, such as remote detection systems
  - Instrumental, telemetry, audible alarms
  - Headwater/tailwater detectors
  - Coordination of special procedures with local authorities

### **Response During Periods of Darkness**

- Actions to illuminate the dam to facilitate gate and other operations
- Operation of equipment during power failure
- Procedures for notifying officials
- Impact on expected response times
- Non-business hours
- Other instructions

### **Access to Site**

- Primary and secondary routes
- Means for reaching the site under various conditions (e.g. foot, boat, car, snowmobile)
- Expected travel times
- Special instructions

### **Response During Weekends and Holidays**

- Planned actions based on the dam operators schedule
- Special instructions

### **Response During Periods of Adverse Weather**

- Actions to be taken for different conditions, including when the dam will not be attended
- Methods of access
- Expected response time
- Special instructions

### **Alternate Systems of Communication**

- Availability and use of alternative systems
- Alternative channels
- Proper procedures
- Special instructions

### **Emergency Supplies and Resources**

- The stockpiling of materials and equipment
- Coordination of information on flood flows
  - National Weather Service, dam owners (up and downstream)
  - Actions to lower the reservoir (i.e., reduce inflow and increase outflow)
  - Who, when, and how to take action
  - Provisions of alternative sources of power, including location, mode of operation, and transportation
  - Site-specific actions

## **Section VII: INUNDATION MAPS**

The inundation maps are of extreme importance in the development of the notification flowchart.

The following are considerations in the development of the inundation maps for the EAP:

- The inundation maps are the responsibility of the dam owner to have completed. An engineer is usually required.
- The development of the maps must be coordinated with relevant agencies.
  - Maps must provide information required by the agencies because the agencies will depend on the maps for evacuation
- The maps must be usable and of appropriate scale. They must be clear and not cluttered with extraneous information.
- If possible, the base map must be the most recent aerial photograph. Roads and other structures must be clearly identifiable and labeled.
- The dam and lake area must be labeled and color-shaded.
- Three failure scenarios must be analyzed unless otherwise approved.
  - Inflow design flood must be fully documented
  - For on-stream dams, the scenarios must include a “sunny day”, 100-year (or possibly 25% PMF), and PMF base condition. Each scenario must be shown on the maps unless otherwise approved.
  - For upground reservoirs or lagoons, the scenarios must include a “sunny day” scenario that assumes the reservoir is at its normal operating level and no flooding conditions on receiving streams. The scenarios must also include a 100-year scenario that assumes the reservoir level is at the top of the dam and there is a 100-year flood occurring on the receiving stream.
  - Color or cross-hatching should be used for different scenarios.

- When developing inundation maps for Class II or III dams, the design flood of 50% or 25% of the PMF, respectively, can be used as the largest dam failure scenario.
- The maps must show peak discharge, maximum flood elevation, and travel time.
- The maps must include a legend that describes each failure scenario, a definition of travel time, scale, north arrow, and any other information depicted on the maps.
- A note must be included on the maps that explain why the study terminates at the chosen location.
- An index should be used if the map covers several pages.
- Existing field conditions should be shown on the base map.
- The accuracy and limitation of the maps should be described.
- The maps should be supplemented with a narrative description of the areas affected by the dam break, with surface profiles, and with a characteristic of the failure condition assumed in the preparation of the inundation maps.

## **Section VIII: APPENDICES**

There are four appendices to be developed for the EAP:

- Appendix A: Investigation and Analyses of Dam Break Floods.
- Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP
- Appendix C: Site-Specific Concerns
- Appendix D: Approval of the EAP

### **Appendix A: Investigation and Analysis of Dam Break Floods**

Appendix A must include data on the following:

- Methodology
- Prevailing streamflow conditions
- Breach assumptions
- Termination of downstream routing

### **Appendix B: Plans for Training, Exercising , Updating, and Posting the EAP**

#### **Training**

- Training plan and schedule, with provisions for annual training
- Familiarity with EAP
- Problem detection and evaluation

#### **Exercising**

- Exercising plan and schedule, with provisions for annual drills
- Tabletop and functional exercises
- Test remote sensing equipment
- Evaluation of exercises
- Follow-up on recommendation

The follow-up training course focuses on exercising the EAP.

## **Updating**

- Process for revisions
  - Annual review
  - Updating for personnel changes
  - Exercise lessons learned
- Distribution of updated plans

## **Posting the EAP**

- Posting must be up-to-date
- Place EAP in prominent locations
- Post copies of complete and up-to-date EAP in a location near the posted flowcharts

## **Appendix C: Site-Specific Concerns**

Appendix C should include the following:

- Site-Specific concerns that affect the EAP
- A Glossary, if needed

## **Appendix D: Approval of the EAP**

The documentation included in Appendix D:

- Must be signed by all parties
- Indicates the approval and acceptance of responsibilities
- Helps ensure that all parties understand the EAP and their roles and responsibilities